

Determining optimum electro discharge machining parameters for drilling of a small hole by utilizing Taguchi method

ABSTRACT

Electro discharge machining (EDM) is a process that uses an electric sparks to generate the high temperature and melt the workpiece. One of the EDM process is drilling. In EDM drilling, an electro thermal mechanism is introduced between the electrode and work piece to create the hole. The hole size is dependent on the diameters of electrode used during the drilling process. The present study performs Taguchi method to investigate the optimal process parameters for high-speed EDM super drill machine that is used to make a small hole. The workpiece used is made from titanium alloy (Ti-6: ASTM B348 Grade 5) and the copper electrode is 2.0 mm in diameter. In this experiment, the process parameters that were selected to be optimised are: current pulse off, maximum current and standard voltage levels. An orthogonal array L9 were employed to analyze the hole enlargement and material removal rate (MRR) depending on 2.0 mm diameter hole penetration. The optimum EDM parameters for hole making process was established and verified with the acquired results.

Keyword: ANOVA; High speed drilling; Hole enlargement; Material removal rate; Optimization; S/N ratio; Taguchi method